US Army Corps of Engineers®
Engineer Research and Development Center

Battlespace Terrain Reasoning and Awareness (BTRA)

Description and Background

Terrain and weather effects represent a fundamental, enabling piece of battlefield information supporting situation awareness and the decision-making processes within C4ISR. These effects can both enhance or constrain force tactics and behaviors, platform performance (ground and air), system performance (e.g. sensors) and the soldier. BTRA's focus is the development of software analytics designed to create information and knowledge products that capture integrated terrain and weather effects and develop predictive decision tools to exploit those products. The ultimate objective is to empower Commanders, soldiers and systems with information that allows them to understand and incorporate the impacts of terrain and weather on their functional responsibilities and processes.

BTRA developments stress computational efficiency and seek to maximize the ratio between the actionable information content of its products and the size of the products to ensure their ability to be transmitted over tactical communication networks. BTRA decision tools are designed and engineered to be embeddable in other host C4ISR systems and applications or as services within a system of systems concept.

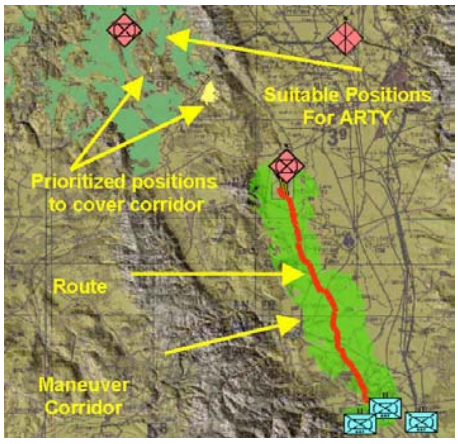
Key Capabilities

BTRA focused on the development of six (6) information generation components and five (5) decision tools addressing terrain and weather effects. Each of these components utilizes terrain feature data, digital elevation models, current and forecasted weather and information regarding tactics, techniques and system performance. BTRA generates information addressing: 1) Observation, Cover and Concealment, Obstacles and Mobility, Key terrain and Avenues of approach (OCOKA), 2) integrated products defining operational Positions of Advantage, 3) high fidelity weather/terrain effects of mobility and signature physics, 4) advanced mobility analysis, 5) digital ground and air maneuver potential and 6) tactical structures relating information produced by the other components.

Decision tools operate on BTRA information products, not the original data. These tools support: 1) predictive multi-criteria, multi-objective maneuver and logistical route analysis for ground and air platforms and forces, 2) predictive sensor performance (e.g. IR, MMW, seismic and acoustic), 3) situation assessment and 4) predictive threat assessment.

Current Status

BTRA will continue R&D through 2006. Mature BTRA components (Version 2.0) have been fielded in the Army's Digital Topographic Support System (DTSS (Version 8.0). Similar capability has also been fielded in the Air Force's Time Critical Targeting Facility, part of Theater Battle Management Core Systems (Baseline 10). BTRA, under funding from the Office of the Secretary of Defense, will continue the transition of current and maturing capabilities to NIMA's Commercial Joint Mapping Toolkit (CJMTK), DTSS and the Air Force. Under MOA, the ERDC will embark on joint technology development with CECOM and NIMA (CJMTK).



Point of Contact

Mike Powers, Michael.W.Powers@erdc.usace.army.mil, (703) 428-7804